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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/691,405	10/17/2000	Steven R. Binder	2558B-063700US	3942

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EXAMINER	
WHALEY, PABLO S	
ART UNIT	**PAPER NUMBER**
1631	
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04/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/691,405	BINDER ET AL.	
	Examiner	Art Unit	
	Pablo Whaley	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5-10 and 12-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-10 and 12-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/10/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

EXAMINER'S COMMENT

It is noted that the Examiner of record has changed. Please address future responses to Examiner Pablo S. Whaley, USPTO, AU 1631.

RE-OPENING PROSECUTION

Prosecution on the merits is hereby re-opened in view of the newly added claim rejections set forth below. Applicants' response, filed 12/28/2006, has been fully considered. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

CLAIMS UNDER EXAMINATION

An action on the merits of claims 1, 2, 5-10, and 12-20 follows.

INFORMATION DISCLOSURE STATEMENT

The information disclosure statement filed 07/10/2006 has been considered in full.

CLAIM REJECTIONS - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1, 2, 5-10, and 12-20 are rejected under 35 U.S.C. 101 because these claims are drawn to non-statutory subject matter. According to the revised Guidelines, a claimed invention directed to a statutory process must result in (1) a practical application by physical transformation (i.e. reduction of an article to a different state or thing), or (2) a practical application that produces a concrete, tangible, and useful result [State Street Bank & Trust Co. v. Signature Financial Group Inc. CAFC 47 USPQ2d 1596 (1998)], [AT&T Corp. v. Excel Communications Inc. (CAFC 50 USPQ2d 1447 (1999)]. The revised Guidelines also state that the focus is "not on whether the steps taken to achieve a particular result are useful, tangible, and concrete, but rather on whether the final result achieved by the claimed invention is useful, tangible, and concrete."

In the instant case, claims 1 and 17 are directed to methods of identifying whether a test subject is suffering from one or more systemic autoimmune diseases. Claim 1 results in a step of "identifying which of said autoimmune diseases the test subject is suffering from if a statistically derived decision indicates that the test subject is suffering from one or more of said autoimmune diseases." Claim 17 results in a step of "applying a k-nearest neighbor algorithm." Thus, the claimed methods do not result in a physical transformation of matter, as this claimed result encompasses a non-physical method step that may be practiced inside of a computer (i.e.

in-silico). Where a claimed method does not result in a physical transformation of matter, it may be statutory where it recites a result that is concrete (i.e. reproducible), tangible (i.e. communicated to a user), and useful result (i.e. a specific and substantial). For the above reasons, the instant claims lack a "tangible" result and thus do not recite more than a 35 U.S.C. 101 judicial exception. Therefore, the instant claims are not statutory.

This rejection could be overcome by amending the claims to recite a step wherein the result of the claimed method is communicated to a user (i.e. real world result), graphically displayed, or output (e.g. to a user, to a memory, or to another computer). For an updated discussion of statutory considerations, see the revised Guidelines for Patent Eligible Subject Matter in the MPEP 2106, Section IV (Latest Revision August 2006).

CLAIM REJECTIONS - 35 USC § 112, 2nd Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 2, 5-10, and 12-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 17 are rejected for the following reasons. Claims which are directly or indirectly dependent from claim(s) 1 and 17 are also included as rejected herein, due to said dependence.

Claim 1 recites the limitation wherein test data (step a) and reference data (step b) are "obtained by subjecting a biological sample...". It is unclear whether said "obtained by subjecting" is intended to be an active method step, a further limitation of said data, or otherwise. Clarification is requested via clearer claim language. It is noted that the nature of the test data, per se, has no restrictive effect on the instant method.

Claim 1 recites the limitation "identifying which of said autoimmune diseases the test subject is suffering from if the statistically derived decision indicates that the subject is suffering from one or more of said...diseases." It is unclear in what way said "identifying which of said...disease" the subject is suffering from is determined based on the conditional statement "if the statistically derived decision indicates that the subject is suffering from one or more of said...diseases" is indefinite (e.g. it could be the case where there is no indication of disease). Clarification is requested via clearer claim language.

Claim 17 recites the limitation wherein data values (step a) are "obtained by subjecting a biological sample...". It is unclear whether said "obtained by subjecting" is intended to be an active method step, a further limitation of said data values, or otherwise. Clarification is requested via clearer claim language. It is noted that the nature of the test data, per se, has no restrictive effect on the instant method.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 12, 13, 14, and 17-20 are rejected under 35 U.S.C. 103(a) as being obvious by Zimmerman et al. (Electrophoresis, 1995, Vol. 16, p.941-947), in view of Kim et al. (IDS, filed Jul.10,2006, IEEE Transactions on Pattern Analysis and Machine Intelligence, 1986, p.761-765), and further supported by Anderson et al. (WO/1999/039298; Filed 03/02/1999).

Zimmerman et al. teach a computer-implemented method for identifying and classifying patient derived autoantibody data by discriminant analysis [Abstract]. More specifically, Zimmerman et al. teach the following aspects of the instantly claimed invention:

- Screening of sera for autoantibodies by obtaining biological sample data (i.e. test data) from patients with myositis and myopathy [Fig. 1] and [p.946, Section 4], and obtaining

data representing levels associated with disease specific autoantibodies [Fig. 2 and 3A], as in claims 1, 12, 13, 14, and 17.

- Storing blot data obtained from patient serum with autoantibodies associated with known diseases in a computer database (i.e. memory) [Abstract and Sections 2.4.1 and 2.4.2], which is a teaching for a plurality of "reference data" sets as in claims 1 and 17.
- Obtaining an integrated "Megablot" comprising values associated with myositis (left), myopathy (right) and neither ("0" values) [Fig. 3B, 3C, and 3D], which equates to a teaching for values that are associated with neither disease, as in claims 1 and 17.
- Comparison of blots of known groups to unknown samples using discriminate analysis [p.944, Col. 2, ¶ 2] and providing a statistically derived decision as output [p.945, Col. 2 and Table 1], as in claims 1, 17, and 18.
- Computer system comprising software and hardware components for implemented the above process [Section 2.2 and 2.3], which equates to an automated system as in claims 19 and 20.

Zimmerman et al. do not specifically teach a "k-nearest neighbor" process, as in claims 1 and 17. However, Zimmerman et al. suggest the use of other pattern recognition based on neural networks [p.947, Col. 1, ¶ 2].

Kim et al. teach a fast k-nearest neighbor (kNN) search algorithm based on ordered partitions (Abstract). More specifically, Kim et al. teach applying the kNN search algorithm to identify test sample elements that are associated with training sample elements [p.761, Section II, Search Procedure], as well as determining a distance metric (i.e. values) associating test and training data [p.763, col. 1 (lines 1-19)].

Thus it would have been obvious to someone of ordinary skill in the art at the time of the instant invention to practice the method of Zimmerman et al. using the added feature of a "k-nearest neighbor" algorithm taught by Kim et al., where the motivation would have been to improve automated diagnosis of SLE with a more robust statistical "kNN" procedure [Zimmerman et al., Section 4]. One of ordinary skill in the art would have had a reasonable expectation of successfully combining the above teachings in view of Anderson et al., who teach a decision-support computer system using neural network algorithms to classify and identify patterns in antibody data for disease diagnosis [WO/1999/039298; Filed 03/02/1999, Summary of the Invention].

Claims 1, 2, 5-10, and 12-20 are rejected under 35 U.S.C. 103(a) as being obvious by Zimmerman et al. (Electrophoresis, 1995, Vol. 16, p.941-947), in view of Kim et al. (IEEE Transactions on Pattern Analysis and Machine Intelligence, 1986, p.761-765), as applied to claims 1, 12, 13, 14, and 17-20, above, and further in view of Thompson et al. (IDS, filed Jul.10,2006, Lupus, 1993, 2, p.15-19).

Zimmerman et al. and Kim et al. make obvious a computer-implemented method of diagnosing whether a test subject is suffering from a systemic autoimmune disease, as set forth above.

Zimmerman et al. and Kim et al. do not specifically teach the use of SLE antibody profiles, as recited in the claim 16. However, Zimmerman et al. suggest their procedure allows for diagnosis of other autoimmune diseases [Abstract].

Thompson et al. teach a method of identifying subsets of patients with systemic lupus erythmatosus (SLE) based on their autoantibody profile (Abstract). More specifically, Thompson et al. teach the following aspects of the instantly claimed invention:

- Obtaining serum samples from 117 patients with SLE [p.16, Results] and autoantifbody profiles [Table I], wherein said autoantibodies are detected based on individual serum samples and correlated to autoantibody profiles [Table II], as in claims 1 and 17, steps a) and b), and as in instant claim 16.
- Obtaining reference data profiles "Neg" (i.e. negative profiles) representing patients not associated with a disease[Table I], which correlates to at least one reference data set associated with none of the diseases, as in instant claim 1, step b.
- Identifying patients associated with clinical manifestations of disease based on statistically derived autoantibody profile data [Tables III and IV], as in instant claims 1 and 17. It is noted that the instant claims are broad with respect to a "statistically derived decision" that "indicates." Therefore, the Examiner has broadly and reasonably interpreted said limitation(s) to encompass the teachings of Thompson et al.
- A plurality of autoantibody profiles for all 117 patients indicative of patients suffering from two or more systemic autoimmune diseases (e.g. SLE and Sjorgren's) [Table II and III] and [p. 18, Discussion], as in claims 1, 2, 5, and 6. The limitation directed to a plurality of autoantibodies from 10-100 and 15-25, as in claims 5 and 6, are not functional aspects of the instant method and therefore have not been given patentable weight over the teachings of Thompson et al.
- Antibody profiles to antigens comprising SSA, SSB, Centromere, Scl-70, Sm, nDNA, and histone [Abstract], as in instant claims 7 and 8. It is noted that as the specification does not provide any limiting definitions for the claimed antigens, the Examiner has broadly

interpreted the antibodies recited in claims 7 and 8 to encompass the teachings of Thompson et al. (e.g. a teaching for SSA has been broadly interpreted as a teaching for SSA 60, 53, and 48). Thus Thompson et al. at a minimum makes obvious fifteen antigens as required by claims 7 and 8.

- Biological reference samples from 117 patients with SLE are studied [p.16, Results], wherein autoantibodies are detected based on individual serum samples [Table II], as in claims 9, 12, 13. The limitation of reference samples from 200-2000, as in claim 10, is not a functional aspect of the instant method and therefore has not been given patentable weight over the teachings of Thompson et al.
- Analysis methods based on immunofluorescensce detection [p.16, Col. 1 and Col. 2, Laboratory Methods], as in claim 15.

Thus it would have been obvious to someone of ordinary skill in the art at the time of the instant invention to practice the method of Zimmerman et al. with the added feature of a "k-nearest neighbor" algorithm taught by Kim et al., using the SLE antibody profiles of Thompson et al. to improve automated diagnosis of SLE with a more robust statistical "kNN" procedure [Zimmerman et al., Section 4]. One of ordinary skill in the art would have had a reasonable expectation of successfully combining the above teachings in view of Thompson et al., who suggest methods of statistical analysis applied to SLE data (p.16, lines 31-33).

Provisional Obviousness-Type Double Patenting Rejection

The non-statutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent

possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 C.F.R. 1.321 (c) may be used to overcome an actual or provisional rejection based on a non-statutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 C.F.R. 1.130(b). Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 C.F.R. 3.73(b).

Claims 1-2, 7, 8, and 17 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-17 of co-pending Application No. 10/828,846. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the broadly encompassing scope of the instantly claimed invention causing the inventions to have overlapping embodiments. The instant claims and those of '405 recite the same method steps, with minor variations. For example, claims 1-3 of the application 10/828,846 and instant claims 1-2 of are directed to computer-implemented methods for identifying specific autoimmune diseases using a 'k-nearest neighbor' algorithm. It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to use the appropriate plurality of antibodies and then compare test data and stored reference data using said algorithm to identify disease. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

CONCLUSION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pablo Whaley whose telephone number is (571)272-4425. The examiner can normally be reached on 9:30am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached at 571-272-0735. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Pablo S. Whaley

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